

SNAP-IN DISPLAY FRAME

FIELD OF THE INVENTION

[0001] This invention relates, in general, to an electronic package assembly and, more particularly, to a mounting apparatus for mounting a display screen to a printed circuit board, wherein the mounting apparatus includes a snap-fit connector.

BACKGROUND OF THE INVENTION

[0002] Printed circuit boards have numerous electronic components mounted to them, such as resistors, capacitors, and microchips. Sometimes, in order to ease the installation of these electronic components onto the printed circuit board, an electronic package assembly is manufactured which houses the electronic component. The electronic package assembly is then used to mount the electronic component onto the printed circuit board. A specific example of such a packaged electronic component is an accelerometer, which may, for example, be mounted on a printed circuit board used in automobiles to activate an airbag, for instance.

[0003] Another example of a packaged electronic component is a display screen for viewing information, which may, for example, be mounted to a printed circuit board for use in such things as automobiles, airplanes, hand-held devices, laptop computers, and to any electronic devices, for example. As defined herein, a display screen is any device which may be used to view non-static, or changing, information known to those skilled in the art, such as, for example, a liquid crystal display, a plasma screen, or a cathode ray tube. Additionally, as defined herein, a hand-held device is any device which is portable and may be held in one's hands, such as but not limited to, a portable computer, a glucose meter, a GPS unit, a telephone, and a personal digital assistant (PDA).

[0004] Typically, display screens are mounted to a printed circuit board using one of the following conventional methods: screw-type fasteners and metal compression frames, metal compression frames with bend tabs, pins soldered to the display screen and then soldered to the printed circuit board, heat seal flex circuits attached to a display screen and then heat sealed or soldered to a printed circuit board. If a compression frame is used, the display screen must be secured to the compression frame, and then the compression frame must be attached to the printed circuit board by either fastening the compression frame to the printed circuit board with metal screws, or by inserting the metal compression frame through the printed circuit board and then bending the bend tabs. Furthermore, most methods employ a separate location bezel between the printed circuit board and the display screen to precisely locate the display screen in the X, Y and Z axes.

[0005] Installing a display screen onto a printed circuit board using the above disclosed electronic package assembly is not a simple task and can be rather cumbersome. For example, connecting the display screen to the printed circuit board using the compression frame requires a substantial amount of time and labor, in addition to the high cost for parts. Additionally, using the compression frame introduces variability in assembly quality, such as the amount of torque used to tighten the screws, and the exact placement of the

display screen. Accordingly, further development of electronic package assemblies, and in particular mounting apparatus for mounting electrical components such as display screens to printed circuit boards is necessary to save time and labor during the installation of these electronic components.

SUMMARY

[0006] The present invention is defined by the following claims, and nothing in this section should be taken as a limitation on those claims. By way of introduction, the preferred embodiments described below relate to an apparatus for mounting a display screen to a printed circuit board. The display screen has four edges. The apparatus includes a top member opposed to a bottom member, and first and second snap-fit members. The top member and the bottom member each forming an overhang, wherein each overhang is adapted to receive an edge of the display screen. The first snap-fit member is connected with and extended outwards from the top member. The second snap-fit member is also connected with and extended outwards from the bottom member. Both the first and the second snap-fit members are adapted to connect with the printed circuit board for snap-fit assembly of the mounting apparatus to the printed circuit board.

[0007] The preferred embodiments further relate to an electronic subassembly. The electronic sub-assembly comprises a display screen, a printed circuit board, and a mounting apparatus. The mounting apparatus comprises a top member opposed to a bottom member, wherein the top member and the bottom member each forming an overhang, and wherein each overhang receives an edge of the display screen. The mounting apparatus also comprises a first snap-fit member connected with and extending outwards from the top member, and a second snap-fit member connected with and extending outwards from the bottom member. The first and second snap-fit members are connected with the printed circuit board. Further aspects and advantages of the invention are discussed below in conjunction with the preferred embodiments.

BRIEF DESCRIPTION OF SEVERAL VIEWS OF THE DRAWINGS

[0008] FIG. 1 is an exploded bottom perspective view of an electronic sub-assembly having a mounting apparatus for mounting a display screen to a printed circuit board, according to one preferred embodiment;

[0009] FIG. 2 is an assembled top perspective view of the electronic sub-assembly shown in FIG. 1, according to one preferred embodiment;

[0010] FIG. 3 is an assembled bottom perspective view of the electronic sub-assembly shown in FIG. 1, according to one preferred embodiment;

[0011] FIG. 4 is an enlarged bottom perspective view of a portion of the electronic sub-assembly shown in FIG. 1, according to one preferred embodiment;

[0012] FIG. 5 is an enlarged side view of a portion of the electronic sub-assembly shown in FIG. 1, according to one preferred embodiment;

[0013] FIG. 6 is an exploded top perspective view of a portion of the electronic sub-assembly shown in FIG. 1, according to one preferred embodiment;